

What is claimed is:

1. A lens drive mechanism comprising:

a first sub-lens group frame and a second sub-lens group frame for supporting a first sub-lens group and a second sub-lens group, respectively, said sub-lens groups functioning optically in a mutually close position and in a mutually distant position, with respect to the optical axis thereof;

a support frame for supporting said first sub-lens group frame and said second sub-lens group frame;

a first linear guide mechanism provided between said first sub-lens group frame and said support frame, said first linear guide mechanism guiding said first sub-lens group frame while permitting movement thereof in the optical axis direction and preventing rotation thereof about the optical axis;

a second linear guide mechanism provided between said second sub-lens group frame and said support frame, said second linear guide mechanism guiding said second sub-lens group frame while limiting rotation of said second sub-lens group frame at two extremities of rotation thereof over a predetermined angle, and linearly guiding said second sub-lens group frame in the optical axis direction at the

two extremities of rotation;

a lens frame shift mechanism for causing said first sub-lens group frame and said second sub-lens group frame to move to said mutually close position and said mutually distant position, in accordance with rotation of said second sub-lens group frame between said two extremities of rotation; and

a linear displacement mechanism which integrally moves said first sub-lens group frame and said second sub-lens group frame in the optical axis direction, in said mutually close position and in said mutually distant position;

wherein a linear guide clearance of said first linear guide mechanism is larger than a linear guide clearance of said second linear guide mechanism.

2. The lens drive mechanism according to claim 1, wherein said first and second sub-lens groups form one of a plurality of variable lens groups for varying a focal length thereof, and said first and second sub-lens groups constitute a focusing lens group which advances or retreats in the optical axis direction while maintaining said mutually close position or at said mutually distant position, regardless of said focal length.

3. The lens drive mechanism according to claim 1, wherein said lens frame shift mechanism includes a cam surface and a follower provided on opposed surfaces of said first sub-lens group frame and said second sub-lens group frame, said cam surface and the follower being arranged so as to move said first sub-lens group frame and said second sub-lens group frame to said mutually close position and said mutually distant position as said second sub-lens group frame is rotated.

4. The lens drive mechanism according to claim 3, further comprising:

a positioning recess formed as a continuation of the opposite ends of said cam surface, said positioning recess defining relative positions of said first sub-lens group frame and said second sub-lens group frame in the optical axis direction and in the circumferential direction by engaging with said follower when said first sub-lens group frame and said second sub-lens group frame are in said mutually close position and in said mutually distant position; and

a biasing member for biasing said first and second sub-lens group frames to bring said positioning recess and said follower into engagement,

wherein said first sub-lens group frame and said second sub-lens group frame are held together in said mutually close position and in said mutually distant position due to the engagement of said follower and said positioning recess.

5        5.        The lens drive mechanism according to claim 1, wherein said first linear guide mechanism comprises:

10        a plurality of guide bores formed on said first sub-lens group frame at different positions in the circumferential direction; and

         a plurality of guide rods loosely fitted in each of said guide bores and secured to said support frame;

         wherein said second linear guide mechanism comprises:

15        a plurality of guide projections formed on said second sub-lens group frame at different positions in the circumferential direction; and

         a close-position linear guide slot for said mutually close position and a distant-position linear guide slot for said mutually distant position, said close-position linear guide slot and distant-position linear guide slot being formed on an inner surface of said support frame at different positions in the circumferential direction to slidably receive each corresponding said plurality of guide

projections.

6. The lens drive mechanism according to claim 5, wherein a rotation-permitting recess is further formed on the inner surface of said support frame in the circumferential direction, for allowing said guide projections to move between said close-position linear guide slot and said distant-position linear guide slot.

7. The lens drive mechanism according to claim 1, wherein an actuator ring is rotatably provided in said support frame and is rotated to cause said lens frame shift mechanism and said linear displacement mechanism to operate.

8. The lens drive mechanism according to claim 7, said linear displacement mechanism includes a cam surface and a follower provided on opposed surfaces of said actuator ring and said second sub-lens group frame, said cam surface and the follower being arranged to move said second sub-lens group frame in the optical axis direction in accordance with rotation of said actuator ring when said second sub-lens group frame is guided by said second linear guide mechanism.

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